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Designation: Raw material resulting from blending cellulose material in powdered form and a plastic polymer powder and process for manufacturing the same

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Raw material resulting from blending cellulose material
in powdered form and a plastic polymer powder
and process for manufacturing the same

The present invention concerns a raw material that results from blending a cellulose material in powder-form and a plastic polymer powder, specifically for the manufacture of continuously extruded profiled sections.

Recently, wood and thermoplastic material have been successfully bonded to each other to obtain a product capable of extrusion or molding. Profiled sections of the most varied forms, which are manufactured by means of extrusion of a PVC wood-flour bond, are on the market. Instead of extrusion, an injection process and pressing process are considered as possibilities for manufacturing this type of material.

The objects manufactured from this material are wood-like in appearance, whereby, in contrast to wood, however, they exhibit considerably better properties. The properties are likewise better in contrast to hard PVC. The hardness and the elastic modulus are about twice as high as that for hard PVC. The material neither swells nor alters its mass as a result of altered conditions in the environment, such as humidity or water content. Thermal expansion is considerably lower than that for hard PVC. In contrast to wood,

the material exhibits higher wear and abrasion resistance as well as [higher] surface hardness.

Moreover, such material can be very easily processed. It can be processed on machines used for standard wood processing, and, like wood, it can be bonded to other materials. On the other hand, the material can also be processed using processes commonly employed in processing of PVC, such as welding. It accepts exterior finishes very well, whereby it has proven that these finishes exhibit better long-term bonding properties than is the case for wood. In short, this material exhibits many favorable properties, which is why it is certain to have a wide area of application. The manufacture of this material is conducted in a standard way, so that wood-flour and plastic polymer powder — PVC powder, e.g., are mixed and heated in, e.g. a continuous extruder and then extruded from the same.

Nevertheless, it appears that very uneven results occur if the wood-flour is not sufficiently dry during processing. As soon as a certain moisture content is exceeded in the wood flour, flaws can be detected in the end product. They are attributable to the fact that when the mixture is heated in the extruder, the water [contained] in the wood-flour evaporates and forms bubbles. These bubbles form blow-holes in the end product, and are the cause of irregularities in the surface of the extruded profiled sections.

Up to now, if one wanted to avoid difficulties in the manufacturing process, one had to accept very high expenditures for the storage of raw material, specifically the wood-flour. In practice, the wood-flour was stored in moisture-proof containers — mainly in a vacuum. Until now, transporting the wood-flour has also proven to be correspondingly difficult and expensive. It is obvious that these conditions are very unfavorable. The present invention is aimed at solving the problem of presenting a raw material of the

type cited in the introduction, that does not exhibit such disadvantages — that is, a material that is largely resistant to humidity and therefore easy to store. According to the invention, this is achieved if the raw material exists in the form of a granulate in whose grains the constituent components are baked together.

By means of the invention the raw material exists in a form in which the humidity-receptive surface of the cellulose component, e.g. the wood, is reduced to a minimum in the compound. The greater part of the wood is surrounded by the plastic polymer [and] sealed against exterior influences. Only those minute parts of the wood-flour that stick out through the exterior film of the plastic polymer on the surface of the grains are receptive to humidity from the outside. Nevertheless, these components are very negligible because during granulation, the surface tension of the gelling plastic polymer produces a largely sealed plastic surface.

A raw material of the aforementioned type is expediently manufactured in such a way that dry wood-flour and plastic polymer are mixed with each other in a known way; the mixture, which is sealed against humidity, is subsequently fed to a granulator device in which the mixture is processed into a granulate at a temperature at which the plastic polymer gels and the granulate is subsequently cooled. Inasmuch as the wood-flour is not sufficiently dry, it is advisable to dry the wood-flour before mixing with plastic polymer powder. The finished granulate can then be stored — e.g. loaded into sacks — or (also) transported directly for further processing. In addition to the intrinsic favorable properties of the granulate for the manufacture of the end products, which also manifest themselves in the aforementioned favorable properties of the end product, according to the invention, the raw material has yet an additional advantage: further processing does not have to be conducted using a dust-producing material. Therefore, unpleasant effects to the environment are also reduced to a large degree.

Although the present invention was explained using wood-flour as a moisture absorbing material in the mixture, it should be emphasized that the application of the invention is possible anywhere where other cellulose materials are used.

Claims

1. Raw material mixed together with a cellulose material in powder form such as wood, or the like, and a plastic polymer powder, specifically for the manufacture of continuously extruded profiled sections, present in the form of a granulate in the grains the components are baked together.
2. Process of manufacturing a raw material according to Claim 1, characterized by the cellulose material and the plastic polymer mixed together in a known way, so that the mixture, which is sealed against humidity, is subsequently fed to a granulating device and processed therein to granulate at a temperature at which the plastic polymer gels, and the granulate is subsequently cooled.
3. Process, according to Claim 2, characterized by the fact that the cellulose material is dried before mixing it with the plastic polymer powder.